[CLAIMS]

1. A method for frequency modulation halftoning using halftone dots in which at least one halftone dot consists of a cluster of adjacent pixels located on a pixel grid, characterized in that the cluster of adjacent pixels can be positioned at any arbitrary position of the pixel grid.

2. The method according to claim 1 wherein said frequency modulation halftoning method is based on the error diffusion algorithm.

3. The method according to claim 2 wherein for at least one pixel location a quantization set is determined wherein for at least one quantization value a cluster of at least two pixels is set.

4. A method according to claim 2 to convert an image consisting of input pixels into an output image, the method comprising the steps of:
   - determining
     - a modified pixel that is based upon an input pixel value and
     - a quantization set for the modified pixel value consisting of available quantization values, each quantization value corresponding to an available output pixel value combination of a cluster of pixels, said output pixel value combination resulting in a density value change in an output image;
   - selecting a quantization value out of said quantization set based upon said modified pixel value;
   - calculating an error value that depends on the modified pixel value and the selected quantization value;
   - modifying at least one pixel by adding a fraction of the calculated error;
   wherein the method takes into account the density value change of an area in the output image corresponding to more than one pixel.

5. A method according to claim 4 wherein said cluster comprises at least two pixels.

6. A method according to claim 4 wherein the pixels corresponding to the area in the output image coincide with the pixels of said cluster.

7. A method according to claim 4 wherein said density value changes are taken into account in determining said available calculated quantization values of said quantization set for said pixel.

8. A method according to claim 4 wherein said density value changes are taken into account in determining said modified pixel value for said pixel

9. A method according to claim 4 wherein the clusters of pixels are unequal in size for at least two possible quantization values

10. A method according to claim 4 wherein the cluster size is adjusted depending on the input pixel value

11. A method according to claim 4 wherein the cluster size is adjusted depending on the local contrast of the pixels surrounding the input pixel

12. A method according to claim 4 wherein said method for error diffusion halftoning further comprises a halftone dot distribution alteration step in low and high intensity image regions.

13. A method according to claim 4 wherein the method for error diffusion halftoning is a multilevel halftoning method.

14. A method according to claim 4 wherein the output value of the pixel is set to the corresponding minimum or maximum output value if the input pixel value is the minimum or maximum possible input value.

15. A method for halftoning a color image comprising plural color separated images wherein at least one of the color separated images is halftoned using a method according to claim 1.

16. A method for error diffusion according to claim 2 to convert an image comprising plural separated images representing input pixels into an output image, the method comprising the steps of:
    - determining
        - a modified pixel that is based upon an input pixel of a first separated image and
        - a quantization set for said modified pixel consisting of available quantization

values, each quantization value corresponding to an available output pixel value combination of a cluster of output pixels, said output pixel value combination resulting in a density value change in an output image,

- selecting a quantization value out of said quantization set based upon said modified pixel value,

- calculating an error value that depends on the modified pixel value and the selected quantization value,

- modifying at least one pixel by adding a fraction of the calculated error,

wherein the method takes into account the density value change of an area in the output image corresponding to at least one pixel in a second separated image.

17. Method according to claim 16 wherein the overlap between halftone dots in different separated images is taken into account.

18. Method according to claim 16, in which the plural separated images represent plural color separations.

19. Method according to claim 17, in which the plural separated images represent plural color separations.